



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention • Air Quality Control • Plan Approvals
Supplemental Forms Package
BWP AQ 01 Limited Plan Approvals
BWP AQ 02 Non-Major Comprehensive Plan Approvals
BWP AQ 03 Major Comprehensive Plan Approvals
Permit Fact Sheet

FYI - primary Limited and Comprehensive Plan Approval forms are NOT included here.
Primary forms can be found in the application kit for these categories.
In the application kit, the following eight (8) forms are included.
The applicant will select the forms appropriate for individual projects.
BWP AQ 01 applicants will use the appropriate Limited Plan application.
BWP AQ 02 and 03 applicants will use a CPA Project Summary and select
from among forms CPA-1 through 5 as required for their project.

FYI:
Old Form

Limited Plan Approvals

- BWP AQ 01-A Limited Plan Approval - Fuel Utilization Facility
- BWP AQ 01-B Limited Plan Approval - Non Fuel Emissions

LPA
LPA

Comprehensive Plan Approvals (CPA)

- BWP AQ 02 & BWP AQ 03 - Comprehensive Plan Approval Project Summary Did not exist.

CPA must also include one of the following:

- BWP AQ CPA-1 Fuel Utilization Facility DDS1
- BWP AQ CPA-2 Burner Replacement DDS2
- BWP AQ CPA-3 Non Fuel Emissions DDS3
- BWP AQ CPA-4 Incinerators DDS4
- BWP AQ CPA-5 Solvent Metal Cleaners DDS5

The following Supplemental Forms ARE included here. Where applicable,
Supplemental Forms must be submitted with a Comprehensive Plan Approval application.

Supplemental Forms for Process

- BWP AQ SFP-1 Paint Spraying and Surface Coating DDS6 & 7
- BWP AQ SFP-3 Survey of Noise Potential DDS8

Supplemental Forms for Air Pollution Control Equipment:

- BWP AQ SFC-1 Dry Air Filters (Fabric, Bags, Cartridges, etc) DDS3a
- BWP AQ SFC-2 Cyclonic or Inertial Separators DDS3b
- BWP AQ SFC-3 Wet Collection Equipment (Scrubbers) DDS3c
- BWP AQ SFC-4 Adsorption Equipment DDS3d
- BWP AQ SFC-5 Afterburners DDS3e
- BWP AQ SFC-6 Electrostatic Precipitator DDS3f
- BWP AQ SFC-7 Determination of Best Available Control Technology Did not exist.



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention – Air Quality Control

BWP AQ SFP-1 (for use with BWP AQ 02,03)

Supplemental Form for Spray Paint and Surface Coating

Transmittal Number _____

Facility ID (if known) _____

A. Plans Application Requirements

Important:

When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



This calculation sheet must be completed for each separate coating containing volatile organic compounds (VOCs) utilized. These forms, along with other applicable forms and material, must then be submitted to the appropriate DEP Regional Office for written approval. Please be reminded that all pollutants, whether or not defined as VOC, are subject to permitting requirements and Best Available Control Technology (BACT).

VOLATILE ORGANIC COMPOUND is any compound of carbon which either participates in atmospheric photochemical reactions or which is measured by the applicable reference methods under 40 CFR 60. This definition includes all organic compounds except the following:

- carbon monoxide
- carbon dioxide
- carbonic acid
- metallic carbides or carbonates
- ammonium carbonate
- methane
- ethane
- methyl chloroform (1,1,1-Trichloroethane)
- methylene chloride (dichloromethane)†
- Freon-113 (trichlorofluoromethane)
- CFC-12 (dichlorodifluoromethane)†
- CFC-11 (trichlorofluoromethane)†
- CFC-22 (chlorodifluoromethane)†
- CFC-23 (trifluoromethane)†
- CFC-114 (dichlorotetrafluoroethane)†
- CFC-115 (chloropentafluoroethane)†
- HCFC-123 (2,2-dichloro-1,1,1-trifluoroethane)
- HCFC-134a (1,1,2,2-tetrafluoroethane)
- HCFC-141b (1,1-dichloro-1-fluoroethane)
- HCFC-142b (1-chloro-1,1-difluoroethane)

† These compounds are considered VOCs for the purposes of 310 CMR 7.18 compliance and must be included in the VOC fraction if you are demonstrating compliance with a 7.18 regulation. Otherwise they are to be included as non-VOC liquids in section C below. Consult with your regional DEP/DAQC office if you are unsure of your status.

B. Coating Manufacturer and ID Number

1. Coating manufacturer: _____
2. Coating ID number: _____
3. Coating line applied on (ID #): _____
4. Application method: _____
spray, roller, dip, etc.
5. Substrate coated: _____
plastic, metal, wood, paper, fabric, vinyl, etc.



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention – Air Quality Control

BWP AQ SFP-1 (for use with BWP AQ 02,03)

Supplemental Form for Spray Paint and Surface Coating

Transmittal Number _____

Facility ID (if known) _____

C. Coating Parameters

Note: Items 2 through 5 must add up to item 1.

	As Received from Supplier	As Applied with Reducing Solvent
1. Total pounds per gallon of coating (coating density):	_____	_____
2. Pounds of VOC per gallon of coating:	_____	_____
3. Pounds of solids per gallon of coating:	_____	_____
4. Pounds of water per gallon of coating:	_____	_____
5. Pounds of other non-VOC liquid per gallon of coating*:	_____	_____
6. Gallon of solids per gallon of coating:	_____	_____
7. Pounds of VOC per gallon of solids:	_____	_____

*Non-VOC liquid, for the purpose of this form, is any liquid not included under the definition of VOC. This includes all organic and/or inorganic liquids excluded in the definition of VOC. Water is not included in this non-VOC definition.

Use Section G of this form to show all calculations used in preparing this submittal.

D. Emissions Parameters (as applied)

Note: questions 5 – 7 relate to spraying operations only

1. Maximum application rate (gal/hr):	_____
2. Maximum annual usage (gal/yr.):	_____
3. Maximum pounds of VOC emitted per hour (before control):	_____
4. Maximum pounds of VOC emitted per hour (after control):	_____
5. Percent overspray:	_____
6. Lbs. of particulates emitted per hour (before controls):	_____
7. Lbs. of particulates emitted per hour (after controls):	_____



Transmittal Number

Supplemental Form for Spray Paint and Surface Coating

Facility ID (if known)

List all volatiles in the as-applied coating:

F. Detailed calculations showing the derivation of paint parameters

Use the space below to show all relevant calculations and to identify your references. Attach Material Safety Data Sheets (MSDS) where appropriate, and indicate which section of Regulation 310 CMR 7.18 was assumed to apply to this paint spraying application. The "solids volume" can be determined by difference, after liquid volumes have been determined or by using manufacturer's information.

aq01-03s • rev. 9/01



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention – Air Quality Control

BWP AQ SFP-1 (for use with BWP AQ 02,03)

Supplemental Form for Spray Paint and Surface Coating

Transmittal Number _____

Facility ID (if known) _____

G. Certification

This form must be signed by the owner or by a responsible company official working at the location of the proposed project. Even if an agent has been designated to fill out this form, the owner or responsible officer must sign it.

I certify that I have examined the above and that to the best of my knowledge it is true and complete. (Signature subjects signer to the provisions of the General Statutes regarding false and misleading statements)

Print name

Authorized signature

Position/title

Representing

Date



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality

BWP AQ SFP-3 (for use with BWP AQ 02, 03)

Supplemental Form for Survey of Noise Potential

Transmittal Number _____

Facility _____

Important:

When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Plans Application Requirements

This form is to be submitted together with BWP AQ CPA 03 and BWP AQ CPA 01, *prior* to the modification or the installation of equipment (such as diesel engines, electric generators, or turbines) which has the potential to cause a noise nuisance condition, or a submittal in response to a Department **Notice of Noncompliance** citing a noise nuisance condition.

B. Noise Source

1. Description:

2. Indicate operating schedule:

a. hours/day

b. days/week

c. weeks/year

3. Comments:

C. Noise Abatement Equipment

1.

Manufacturer

Model number

2. Describe type, location, performance characteristics:



D. Full Octave Band Analysis

The following community noise profiles will require the use of sound pressure level measuring equipment in the neighborhood of the installation.

1. Lowest **Ambient** Sound Pressure Levels During Operating Hours of Noise Source.

a. At property line:

<u>"A" Weighted</u>	<u>31.5</u>	<u>63.0</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1K</u>	<u>2K</u>	<u>4K</u>	<u>8K</u>	<u>16K</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

b. At the nearest inhabited building:

<u>"A" Weighted</u>	<u>31.5</u>	<u>63.0</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1K</u>	<u>2K</u>	<u>4K</u>	<u>8K</u>	<u>16K</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

The following noise profiles are required only for a submittal in response to a department **Notice of Noncompliance** citing a noise nuisance condition. Applications for new equipment can skip this section and go ahead to section D3.

2. Neighborhood Sound Pressure Levels with Source Operating without Abatement Equipment.

a. At property line:

<u>"A" Weighted</u>	<u>31.5</u>	<u>63.0</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1K</u>	<u>2K</u>	<u>4K</u>	<u>8K</u>	<u>16K</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____



D. Full Octane Band Analysis (cont.)

b. At the nearest inhabited building:

<u>"A" Weighted</u>	<u>31.5</u>	<u>63.0</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1K</u>	<u>2K</u>	<u>4K</u>	<u>8K</u>	<u>16K</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

3. **Expected** Neighborhood Sound Pressure Levels after Installation of Noise Abatement Equipment.

a. At property line:

<u>"A" Weighted</u>	<u>31.5</u>	<u>63.0</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1K</u>	<u>2K</u>	<u>4K</u>	<u>8K</u>	<u>16K</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

b. At nearest inhabited building:

<u>"A" Weighted</u>	<u>31.5</u>	<u>63.0</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1K</u>	<u>2K</u>	<u>4K</u>	<u>8K</u>	<u>16K</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

Note: The Department may request that actual measurements be taken after the installation of the noise abatement equipment to verify compliance.



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention – Air Quality

BWP AQ SFP-3 (for use with BWP AQ 02, 03)

Supplemental Form for Survey of Noise Potential

Transmittal Number _____

Facility _____

E. Manufacturer's Noise Profile on New Equipment

The applicant must attach the manufacturer's noise generation data for the equipment being proposed for installation. This data must specify the sound pressure levels for a complete 360° turn around the equipment, and at various distances from the equipment.

F. Plot Plan

The plot plan required in form BWP AQ CPA 01 and BWP AQ CPA 03 must include location of the noise source(s) and the distances from the source(s) to the property lines and the nearest inhabited residences, as well as indications of possible future construction areas.

G. Community Sound Level Criteria

Approval of the proposed new equipment or proposed corrective measures will not be granted if the installation:

1. Increases broadband sound level by more than 10dB (A).
2. Produces a "pure tone" condition – when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more.
3. Creates a potential condition of air pollution as defined in 310 CMR 7.01.

Note: These criteria are measured both at the property line and at the nearest inhabited residence. Ambient is defined as the background A-Weighted sound pressure level that is exceeded 90% of the time measured during equipment operating hours. The ambient may also be established by other means with the consent of the department.

H. Certification

The seal and signature of a Massachusetts Registered Professional Engineer must be entered below. This certifies that the information contained in this form has been checked for accuracy, and that the design represents good air pollution control engineering practice. (These must be originals. No photocopies, etc., of the seal and signature will be accepted.)

Print name

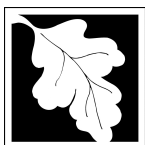
Authorized signature

Position/title

Representing

Date

P.E.#



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality
BWP AQ SFC-1 (for use with BWP AQ CPA-3)
Supplemental Form for Dry Air Filters

Transmittal Number _____

Facility _____

Important:
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Plan Application Requirements

This form is to be submitted together with form BWP AQ CPA-1, CPA-3, or CPA-4, whenever the construction, substantial reconstruction or alteration of a **Dry Air Filter** is desired.

B. Project Location

1. Name of facility: _____

2. Location of project site: _____

Street

City/Town

Zip code

C. Equipment Specifications

1. Manufacturer _____

2. Model Number - attach manufacturer's specifications: _____

3. What is the capacity of the unit? _____

ACFM

in. W.G. pressure drop

4. How many compartments are in the unit? _____

5. How many filter elements are in each compartment? _____

6. What type of filter material is used? _____

7. Is the filter material:

☐ woven ☐ non-woven

8. Maximum recommended temperature: _____

°F

9. Describe the filter elements: _____

tubes, envelopes, cartridges, etc.

10. What is the real area per filter element? _____

feet

D. Operating Conditions for this Permit

1. What is the average inlet gas flow? _____

ACFM, wet

2. What is the moisture content in the inlet? _____

lbs./min

grains/ACF

3. What is the face velocity? _____

ft/sec



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality
BWP AQ SFC-1 (for use with BWP AQ CPA-3)
Supplemental Form for Dry Air Filters

Transmittal Number _____

Facility _____

D. Operating Conditions for this Permit (cont.)

4. What are the gas temperature ($^{\circ}\text{F}$, dry bulb) for the:

inlet _____

outlet _____

5. What is the pressure drop across the unit (in W.G.)?

minimum _____

maximum _____

NOTE: Supporting calculations and explanatory notes must be attached.

E. Particulate Collection Data

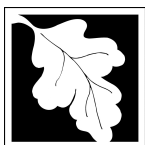
1. Describe the particle size weight to be emitted by the proposed unit:

	% of Total Weight	% of Friction Collected
a. < 1 micron:	_____	_____
b. 1 micron < 10 microns:	_____	_____
c. 10 microns < 50 microns:	_____	_____
d. > 50 microns:	_____	_____

2. What is the overall particulate collection efficiency? _____
3. What is the inlet particulate concentration? (gr/ACF) _____
4. What is the outlet particulate concentration? (gr/ACF) _____
5. What is the emission rate? (lbs/hr) _____

F. Cleaning Procedures and Particulate Disposal

1. Describe the cleaning mechanism _____
pulse jet, reverse jet, sonic, rapping, or other
2. What is the estimated time between cleaning phases? _____
seconds
3. How many filter elements are cleaned at the same time? _____
4. Describe the controller: _____
timer, pressure gauge, other?
5. What is the number of filter elements in operation during the cleaning phase? _____



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality
BWP AQ SFC-1 (for use with BWP AQ CPA-3)
Supplemental Form for Dry Air Filters

Transmittal Number _____

Facility _____

F. Cleaning Procedures and Particulate Disposal (cont.)

6. Describe the collection hoppers and unloading schedule: _____

7. How is the unloading schedule documented? _____
8. What is the ultimate disposal method? _____
9. Is the dust subject to 310 CMR 30.00, pertaining to Hazardous Waste? _____

☐ Yes

☐ No

G. Air Flow Data

1. What is the air flow into the filter system (ACFM)?

Minimum _____

Maximum _____

2. Describe what measure are taken to evenly distribute inlet air to all filter elements:

2. What is the air to cloth ratio? (ACFM divided by the effective filter area):

NOTE: Detailed fan specifications must be supplied with this application. See form BWP AQ CPA-3 for instructions.

H. Drawing of Dry Air Filter Unit

A schematic drawing of the dry air filter unit must be **attached** to this form. The drawing must show all access doors, catwalks, ladders, and exhaust ductwork. In addition, the location of each pressure and temperature indicator must be shown.



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality
BWP AQ SFC-1 (for use with BWP AQ CPA-3)
Supplemental Form for Dry Air Filters

Transmittal Number _____

Facility _____

I. Failure Notification

1. How is the failure of the dry air filter made known to the operator during normal operations, (e.g. audible alarm, flashing lights, temperature indicator, pressure indicator, etc.)?

2. Describe the record keeping procedures to be used in identifying the cause, duration and resolution of each failure (use a separate page if necessary):

NOTE: The regional office must be notified immediately by telephone in the event of a dry air filter failure.

J. Certification

The seal and signature of a Massachusetts Registered Professional Engineer must be entered below. This certifies that the information contained in this form has been checked for accuracy, and that the design represents good air pollution control engineering practice. (These must be originals; no photocopies, etc. of the seal and signature will be accepted.)

Print name _____

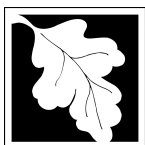
Authorized signature _____

Position/title _____

Representing _____

Date _____

P.E. Number _____



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention – Air Quality Control

BWP AQ SFC-2 (for use with BWP AQ CPA-03)

Supplemental Form for Cyclonic or Inertial Separators

Transmittal Number _____

Facility _____

Important:
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Plan Application Requirements

This form is to be submitted together with Form BWP AQ CPA-3, prior to modification or installation of a **Cyclonic** or **Inertial Separator**.

B. Project Location

1. Name of facility: _____

2. Location of project site: _____

Street _____

City/Town _____

Zip code _____

C. Equipment Specifications

1. Manufacturer: _____

2. Model number: _____

3. What is the capacity of the facility? _____

SCFM

4. Is this a wet or dry unit?

☐ wet

☐ dry

5. If the equipment is a wet unit, identify the following parameters:

a. Water flow rate (gpm) _____

b. Describe the method of recirculation and/or disposing of water and collected particulate: _____

D. Gas Parameters

1. What is the inlet gas flow? _____

ACFM, wet if moisture is involve

2. What is the inlet moisture? _____

lbs/min.

3. What is the inlet temperature? _____

°F

4. What is the outlet temperature? _____

°F

5. What is the pressure drop across the collector: _____

in. of water

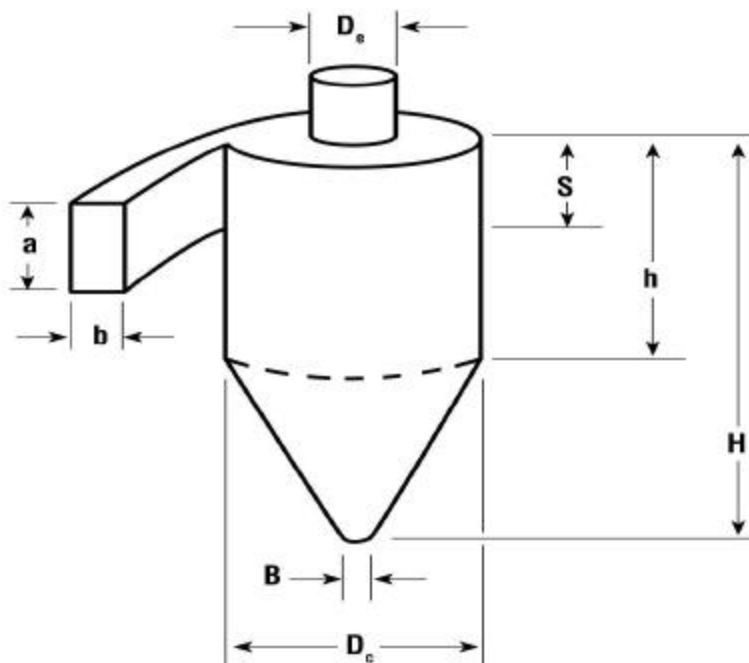
6. Describe how pressure drop was obtained: _____



E. Cyclonic Dimensions

Refer to the sketch below of a simple tangential inlet cyclone in answering the next eight questions. If the proposed unit differs from this design, go to question 9.

(All units should be expressed in inches)



1. What is the inlet height?(a) _____
2. What is the inlet width?(b) _____
3. What is the body diameter?(D_c) _____
4. What is the outlet length?(S) _____
5. What is the outlet diameter?(D_e) _____
6. What is the cylinder height?(h) _____
7. What is the overall height?(H) _____
8. Give the dust outlet diameter?(B) _____
9. The applicant must attach a similar dimensioned sketch to this form if the proposed unit does not conform to the sketch design above.



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention – Air Quality Control

BWP AQ SFC-2 (for use with BWP AQ CPA-03)

Supplemental Form for Cyclonic or Inertial Separators

Transmittal Number _____

Facility _____

F. Emissions Data

1. Describe the particulate inlet data for the proposed unit:

Chemical Name	Particulate Density (lbs./ft)	Inlet Conc. (lbs./hr)	Inlet Conc. (grains/ACF)
a. _____	_____	_____	_____
b. _____	_____	_____	_____
c. _____	_____	_____	_____

2. How was the inlet concentration obtained?

3. Describe the particulate outlet data for the proposed unit:

Chemical Name	Outlet Concentration (lbs./hr)	Outlet Concentration (grains/ACF)
a. _____	_____	_____
b. _____	_____	_____
c. _____	_____	_____

4. Describe the particulate size weight to be emitted by the proposed unit (microns):

	% of Total	% of Fraction Collected
a. < 10 microns:	_____	_____
b. > 10 < 50 microns:	_____	_____
c. > 50 microns:	_____	_____

NOTE: Supporting calculations and explanatory notes must be attached for the above.

5. Describe the overall unit efficiency for this particulate size distribution:



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention – Air Quality Control

BWP AQ SFC-2 (for use with BWP AQ CPA-03)

Supplemental Form for Cyclonic or Inertial Separators

Transmittal Number _____

Facility _____

G. Particulate Disposal

1. What is the method and frequency of dust removal from the cyclone bottom?

2. Describe the dust level indicators and/or measures to prevent plugging:

3. Describe the ultimate method of disposal for collected particulates:

4. Is collected particulate subject to 310 CMR 30.00, pertaining to **Hazardous Waste**?

☐ Yes

☐ No

H. Failure Notification

1. How is the failure of the collection device made known to the operator, (e.g. audible alarm, lights, etc.)?

2. Describe the record keeping procedures to be used in identifying the cause, duration, and resolution of each failure (use a separate page if necessary):



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention – Air Quality Control

BWP AQ SFC-2 (for use with BWP AQ CPA-03)

Supplemental Form for Cyclonic or Inertial Separators

Transmittal Number

Facility

I. Certification

The seal and signature of a Massachusetts Registered Professional Engineer must be entered below. This certifies that the information contained in this form has been checked for accuracy, and that the design represents good air pollution control engineering practice. (These must be originals; no photocopies, etc. of the seal and signature will be accepted.)

Print name

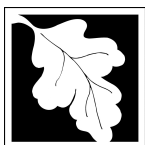
Authorized signature

Position/title

Representing

Date

PE number



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-3 (for use with BWP AQ CPA-3)
Supplemental Form for Wet Collection Equipment

Transmittal Number _____
Facility _____

Important:
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Plan Application Requirements

This form is to be submitted together with forms BWP AQ CPA1, CPA3 or CPA4, prior to the construction, substantial reconstruction or alteration of **Wet Collection Equipment**.

B. Project Location

1. Name of facility: _____

2. Location of project site: _____

Street/PO Box _____

Street _____

City/Town _____

Zip code _____

C. Wet Collection Equipment Specifications

NOTE
Dimension plan(s) of the collection equipment must be attached to this form. The plan(s) must show, at a minimum, the gas inlet duct, gas outlet duct, liquid inlet piping, liquid outlet piping, back flow preventor location, access doors, temperature sensors, pH indicators, flow sensors, liquid level sensors, stack location, nozzle locations, by-pass stack location and other scrubber internals.

1. Manufacturer _____
2. Model number _____
3. What is the capacity of the unit?
SCFM _____
@ standard temperature of ^oF _____
4. What type of unit is being installed?
e.g. gravity spray tower, plate scrubber, venturi scrubber, packed bed scrubber, centrifugal spray scrubber, other _____
5. What material is the outer shell made of? _____
mild steel, stainless steel, nonferrous metal, plastic, other
6. What material is the inner shell made of? _____
7. What is the expected useful life of the equipment?
years _____
8. What steps have been taken to protect against corrosion?

9. What is the cross-sectional area?
square feet _____
10. How many collection stages are there? _____
11. What is the length of the unit?
feet _____



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-3 (for use with BWP AQ CPA-3)
Supplemental Form for Wet Collection Equipment

Transmittal Number _____

Facility _____

C. Wet Collection Equipment Specifications

12. What is the cross-sectional shape?

square, round, etc.

13. Describe the internal features (e.g. demisters, gas/liquid, diffusion plates, liquid redistributors, bed limiters, etc.)

D. Operating Parameters

1. What is the inlet gas flow rate?

ACFM, wet

2. What is the inlet moisture rate (lbs./min)?

3. What is the temperature of the inlet (°F) and outlet (°F)?

Inlet temperature

Outlet temperature

4. What is the static pressure in the inlet and outlet (in. of water)?

Inlet pressure

Outlet pressure

5. What is the outlet gas flow rate?

ACFM, wet

6. What is the normal oxidation/reduction potential set point range?

7. What is the normal pH set point range?



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-3 (for use with BWP AQ CPA-3)
Supplemental Form for Wet Collection Equipment

Transmittal Number _____

Facility _____

E. Emissions Data

1. Give the maximum gaseous emission rates at stack exit:

Chemical name	Before control (lbs./hr)	After controls (lbs./hr)	After controls (ug/DSCM*)
a. _____	_____	_____	_____
b. _____	_____	_____	_____
c. _____	_____	_____	_____

2. What is the overall gaseous collection efficiency? _____ %

3. Give the maximum particulate emissions rates at stack exit:

Chemical name	Before control (lbs./hr)	After controls (lbs./hr)	After controls (ug/DSCM*)
a. _____	_____	_____	_____
b. _____	_____	_____	_____
c. _____	_____	_____	_____

* DSCM = Dry Standard Cubic Meter

4. Describe the particulate size for the proposed unit (include citations of test data or a list of references used):

	% of total	% of fraction collected
a. <1 micron:	_____	_____
b. 1<10 microns:	_____	_____
c. 10<50 microns:	_____	_____
d. >50 microns:	_____	_____

5. Overall particulate collection efficiency: _____ Mass %

6. Inlet particulate concentration: _____ grains/ACF

7. Outlet particulate concentration: _____ grains/ACF

8. Capture efficiency of the ventilation system serving the collection equipment:

Particulate % _____ Gaseous % _____

NOTE:
Supporting
calculations and
explanatory
notes must be
attached for %'s.
Failure to submit
data will render
the plans
application
incomplete.



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-3 (for use with BWP AQ CPA-3)
Supplemental Form for Wet Collection Equipment

Transmittal Number _____

Facility _____

F. Description of Scrubbing Liquid

1. Complete chemical name of scrubbing liquid: _____
2. Normal scrubbing liquid flow rate: _____
Indicate flowmeter location on the process diagram
3. What is the liquid temperature at the inlet ($^{\circ}\text{F}$) and outlet ($^{\circ}\text{F}$)?

_____ Inlet temperature

_____ Outlet temperature

4. What is the density of the liquid?

_____ lb./gal

_____ @ operating temperature of $^{\circ}\text{F}$

5. Liquid pressure to the nozzles (psig): _____
Indicate pressure gauge location on the process diagram
6. If liquid is recirculated, indicate make-up rate: _____
gpm
7. If liquid is recirculated, indicate recirculation rate: _____
gpm
8. Is the recirculated liquid treated for re-use? ☐ Yes ☐ No

_____ If yes, explain

9. Is the pH of the liquid controlled for the purpose of maintaining collection efficiency?

☐ Yes

☐ No

_____ If yes, how is pH measured?

_____ If yes, how is pH controlled?

10. Give a description of the chemical additive(s) used:

Chemical name	Max feed Rate (lbs./hr)	% strength (as mixed w/water)	Reaction products
a. _____	_____	_____	_____
b. _____	_____	_____	_____
c. _____	_____	_____	_____

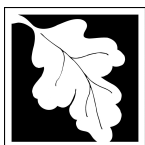
11. Give a detailed description of the contaminants transferred to the scrubbing liquid:

_____ a. Liquid/solid contaminants (lbs./hr)

_____ Briefly describe

_____ b. Gases absorbed (lbs./hr)

_____ Briefly describe



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-3 (for use with BWP AQ CPA-3)
Supplemental Form for Wet Collection Equipment

Transmittal Number _____

Facility _____

F. Description of Scrubbing Liquid

c. Are these contaminants subject to 310 CMR 30.00 pertaining to the control of Hazardous Waste?

☐ Yes

☐ No

If yes, identify the company which will dispose of the contaminated scrubbing liquid:

d. Is a discharge permit (BWP IWW 02) needed?

☐ Yes

☐ No

If yes, attach a copy of the permit

G. Gravity Spray Tower Scrubber

The following six sections ask questions about specific types of wet collection equipment. The applicant should respond only to those questions pertaining to the proposed unit.

1. What type of spray nozzles will be installed (pressure, rotating, gas atomizing, sonic, other)?

Explain

2. How many nozzles will be installed?

3. Give the location of each nozzle?

4. What is the pressure drop across the nozzles?

psig

5. What is the normal liquid to gas ratio?

by weight

Specify units

6. Give the cross sectional area of the tower:

feet

7. What is the height of the tower?

feet

8. What is the superficial gas velocity (ft/sec)?

9. Is the gas flow:

☐ concurrent?

☐ countercurrent?

10. What is the gas retention time?

seconds

11. Is a mist eliminator used?

☐ Yes

☐ No

12. Are baffles present?

☐ Yes

☐ No

13. Does the unit have liquid redistributors?

☐ Yes

☐ No



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-3 (for use with BWP AQ CPA-3)
Supplemental Form for Wet Collection Equipment

Transmittal Number _____

Facility _____

G. Gravity Spray Tower Scrubber (cont.)

14. Describe other features:

H. Centrifugal Spray Scrubber

1. What is the normal liquid to gas ratio? _____
by weight _____
specify units _____
2. Give the height of the unit: _____
feet _____
3. What is the diameter of the unit? _____
feet _____
4. What is the retention of the gas? _____
seconds _____
5. Is the spray directed outward? ☐ Yes ☐ No
6. What type of spray nozzles will be installed? (pressure, rotating, gas atomizing, sonic, other, explain):

I. Plate Scrubber

1. What is the normal liquid to gas ratio? _____
by weight _____
specify units _____
2. What is the cross sectional area? _____
square feet _____
3. What is the height of the unit? _____
feet _____
4. How many trays are there? _____
5. What is the spacing between the trays? _____
inches _____



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-3 (for use with BWP AQ CPA-3)
Supplemental Form for Wet Collection Equipment

Transmittal Number _____

Facility _____

I. Plate Scrubber (cont.)

6. List and describe briefly, the type of tray to be used (sieve, impingement, bubble cap, valve, other):

7. What is the depth of the liquid seal?

_____ inches

8. What is the size of the tray active area?

_____ square inches

9. What is the size of the tray downcorner area?

10. What is the size of the tray perforation area?

_____ square inches

11. What is the number of liquid passes per tray?

12. What is the type of flow?

_____ cross, counter, cascade, or split

13. List other internal features:

J. Venturi Scrubbers

1. What is the normal liquid to gas ratio?

_____ by weight

_____ specify units

2. Is the throat adjustable?

☐ Yes

☐ No

3. If yes, how is it controlled?

Describe briefly

4. How large is the throat area?

_____ square inches

5. What is the shape of the throat cross section?

6. What is the throat pressure drop?

_____ inches of water

7. What is the throat velocity?

_____ feet/second



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-3 (for use with BWP AQ CPA-3)
Supplemental Form for Wet Collection Equipment

Transmittal Number _____

Facility _____

K. Packed Bed Scrubber

1. What is the normal liquid to gas ratio? _____
by weight
Specify units _____
2. What is the height of the bed? _____
feet
3. What is the cross sectional area of each bed? _____
square feet
4. Describe the type of packing element: _____
5. What is the size of the packaging element? _____
inches
6. Is the packaging, ☐ random ☐ stacked ☐ other (explain):

7. How many stages are there? _____
8. What is the packaging factor? _____
as given by manufacturer
9. What is the height of the transfer unit? _____
feet
10. How many transfer units per bed are there? _____
11. What is the liquid flooding point? _____
cubic ft/sec
12. What is the gas loading point? _____
cubic ft/sec
13. The operating point is what % of flooding point? _____
percent
14. Pressure drop per foot of packaging: _____
in. of water
15. Describe the packed bed (crossflow, counterflow, parallel flow, fluid bed, flooded bed, other, explain):

16. What is the number of liquid redistributors? _____
17. Distance between the liquid redistributors _____
inches

(Attach Separate Sheets If Necessary)



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-3 (for use with BWP AQ CPA-3)
Supplemental Form for Wet Collection Equipment

Transmittal Number

Facility

L. Failure Notification

1. How is the failure of the collection device made known to the operator? (e.g. audible alarm, lights, etc.):

2. Describe the record keeping procedures that will be used in identifying the cause, duration, and resolution of each failure (use a separate page if necessary):

M. Certification

The seal and signature of a Massachusetts Registered Professional Engineer must be entered below. This certifies that the information contained in this form has been checked for accuracy, and that the design represents good air pollution control engineering practice. (These must be originals; no photocopies, etc. of the seal and signature will be accepted.)

Print name

Authorized signature

Position/title

Representing

Date

PE number



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control

BWP AQ SFC-4 (for use with BWP AQ 02,03
and BWP AQ CPA-3)

Transmittal Number _____

Facility _____

Supplemental Form for Adsorption Equipment

A. Plan Applications Requirements

Important:
When filling out
forms on the
computer, use
only the tab key
to move your
cursor - do not
use the return
key.



This form is to be submitted together with form BWP AQ CPA-3, whenever the modification or the installation of **Adsorption Equipment** is desired.

B. Project Location

1. Name of facility:

2. Location and Project Site:

Street Address _____

City/town _____

State _____

Zip code _____

C. Equipment Specifications

1. Manufacturer _____

2. Model number _____

3. Give the following information relative to the adsorbate:

a. Total volume of process exhaust to adsorber(s) (SCFM) _____

b. Operating temperature of adsorber (°F) _____

c. Inlet moisture content: lbs./min _____

d. Will the process steam be cooled?

☐ Yes

☐ No

If yes, explain:

e. List the chemical compounds to be adsorbed (generic name for each):

Chemical Name

Inlet Range (lbs./hr)

Inlet Range (ppm)



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control

BWP AQ SFC-4 (for use with BWP AQ 02,03
and BWP AQ CPA-3)

Transmittal Number _____

Facility _____

Supplemental Form for Adsorption Equipment

C. Equipment Specifications (cont.)

- f. Total concentration in air stream to be treated: _____
lb./ft³ & ppm
- g. Temperature at the inlet: _____
°F

If variable, give range
- h. Temperature at the outlet: _____
°F

If variable, give range
- i. Describe the pre-cleaner, if applicable *: _____

***Note:** An additional supplemental form for this equipment may be required.

D. Adsorber Information

Detailed supporting documentation is an essential part of this submittal. Attach all relevant materials to support design assumptions and parameters.

1. Construction material of the adsorber: _____
2. Type of adsorbent to be used: _____
give base material, mesh size, grade, etc.
3. surface area of the adsorbent? _____
m²/g

ft²/lb.
4. Amount of adsorbent used per bed: _____
lbs.
5. Pore size distribution: _____
angstroms
6. Polarity of the adsorbent: _____
7. Estimated removal efficiency of the chemical compounds: _____
%
8. How many vessels will the equipment have? _____
9. Number of beds per vessel _____
10. Face area per bed: _____
square feet
11. Depth of the bed: _____
feet
12. Velocity at face of bed: _____
feet per minute



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control

BWP AQ SFC-4 (for use with BWP AQ 02,03
and BWP AQ CPA-3)

Transmittal Number _____

Facility _____

Supplemental Form for Adsorption Equipment

D. Adsorber Information (cont.)

13. Pressure drop across the unit: _____

(in. of H₂O)

(mm of Hg)

14. Bed volume _____

cubic feet

15. Is the system designed to be pressurized for increased efficiency? ☐ Yes

☐ No

16. If yes, what is the system pressure? _____

in. of H₂O

mm of Hg

17. Hours of operation for the production line(s): _____

hrs/day

days/week

week/years

18. How is the break point time determined and how is cleaning schedule maintained (explain briefly)?

19. Is the system: ☐ regenerative?

☐ non-regenerative?

20. If regenerative, how will the saturated adsorbent be stripped?

21. If by steam, how many lbs./hr? _____

@ psig

@ °F

22. Is direction of stripping opposite to adsorption? ☐ Yes

☐ No

23. Time required to adequately strip (min.)? _____

minutes

24. How will the bed be cooled & dried prior to re-use? _____

NOTE: The downstream design should be indicated on the attached Adsorption Flow Diagram.



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control

BWP AQ SFC-4 (for use with BWP AQ 02,03
and BWP AQ CPA-3)

Transmittal Number _____

Facility _____

Supplemental Form for Adsorption Equipment

D. Adsorber Information (cont.)

25. For non-regenerative adsorbers, indicate the disposal method for the contaminated adsorbent (assigned site(s), contract(s) with licensed haulers, etc.):

26. Are these contaminants subject to 310 CMR 30.00 pertaining to the control of **Hazardous Waste**?

☐ Yes

☐ No

If yes, identify the company that will be disposing of the contaminated scrubbing liquid:

E. Miscellaneous Data

1. Will the collected chemical compounds be re-used?

☐ Yes

☐ No

If yes, describe collection and separation:

If no, describe the disposal method (assigned site(s), contract(s) with licensed haulers, etc.):

2. Chemical activity of adsorbate with adsorbent: _____

3. Give the retentivity of adsorbate with adsorbent: _____

4. How will the unit be winterized? _____

F. Standard Operating and Maintenance Procedures

See form BWP AQ CPA-3 for instructions concerning the required standard operating and maintenance procedures for this control equipment.



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention – Air Quality Control

BWP AQ SFC-4 (for use with BWP AQ 02,03
and BWP AQ CPA-3)

Transmittal Number _____

Facility _____

Supplemental Form for Adsorption Equipment

G. Failure Notification

1. How is the failure of the collection equipment made known to the operator (e.g. audible alarm, lights, etc.)?

2. Describe the record keeping procedures that will be used to identify the cause, duration, and resolution of each failure (use separate page if necessary):

H. Certification

The seal and signature of a Massachusetts Registered Professional Engineer must be entered below. This certifies that the information contained in this form has been checked for accuracy, and that the design represents good air pollution control engineering practice. (These must be originals; no photocopies, etc. of the seal and signature will be accepted.)

Print name _____

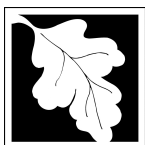
Authorized signature _____

Position/title _____

Representing _____

Date _____

PE number _____



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-5 (for use with BWP AQ 02, 03)
Supplemental Forms for Afterburners

Transmittal Number _____

Facility _____

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Plans Applications Requirements

This form is to be submitted together with Form BWP AQ CPA -3, prior to the modification or the installation of an **Afterburner**.

B. Project Location

Name of facility _____

Street/PO Box _____

City/town _____

State _____

Zip code _____

C. Equipment Specifications

1. Manufacturer _____

2. Model number _____

3. Is the unit, ☐ Thermal? ☐ Catalytic?

4. What is the capacity (SCFM) of the unit? _____

5. Give the combustion chamber dimensions:

a. What is the cross-sectional shape (round, square, etc)? _____

b. What is the cross-sectional area (sq. ft.)? _____

c. What is the chamber length (ft.)? _____

d. What is the effective chamber volume (ft.)? _____

6. Is there a pre-mixing chamber? ☐ Yes ☐ No

If yes, describe _____

7. _____
How is the combustion chamber designed to maximize mixing?

8. Give the following information for the catalytic unit:

a. Give a brief description of the catalyst: _____

b. What are the dimensions of the bed?

height (in.) _____

width (in.) _____

depth (in.) _____

weight (lbs.) _____

9. Describe the afterburner's materials of construction:

a. What is the type of refractory? _____

b. What is the thickness of the materials (in.)? _____

c. What is the shell material? _____

d. What is the expected life of the unit (yrs.)? _____



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-5 (for use with BWP AQ 02, 03)
Supplemental Forms for Afterburners

Transmittal Number _____

Facility _____

D. Fuel and Burner Data

1. List the burner manufacturer(s) and model numbers:

Manufacturer _____

Model number _____

2. What type of fuel is used?

natural gas, oil, other _____

Note: fuel oil will be permitted only where natural gas is unavailable, only distillate fuel oil may be used if it is necessary to burn oil.

3. If gas is used, is it: ☐ Natural gas? ☐ Propane?

a. What is the firing rate of the gas (cu. ft./hr.)?

Max _____

Min _____

b. What is the maximum heat input rate (Btu/hr)?

4. If fuel oil is used, indicate:

a. What is the type of oil? _____

b. What is the % sulfur by weight? _____

c. What is the maximum fuel firing rate (gal/hr)? _____

d. What is the minimum fuel firing rate (gal/hr)? _____

e. What is the maximum heat input rate (Btu/hour)? _____

5. What is the % excess combustion air? _____

6. Describe burner design and explain how proper mixing of fuel and combustion air is achieved:

7. Describe burner modulation system (full modulating, high/low, on/off, etc.):

8. If on/off modulation is used, explain how minimum operating temperature will be maintained at all times:

9. What portion of the contaminant stream will by-pass the burner to be mixed with the flame downstream?



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-5 (for use with BWP AQ 02, 03)
Supplemental Forms for Afterburners

Transmittal Number _____

Facility _____

E. Operating Parameters

1. Contaminant stream inlet flow rate: _____
ACFM, wet
2. Inlet moisture: _____
lbs./min.
3. Temperature at the afterburner inlet and outlet: _____
Inlet (°F) _____
Outlet (°F) _____
4. Static pressure at the inlet and outlet: _____
Inlet – inches of water _____
Outlet - inches of water _____
5. If catalytic, pressure drop across the bed: _____
inches of water
6. Outlet exhaust gas flow rate: _____
ACFM, wet
7. Minimum combustion temperature, as measured
at the downstream end of the combustion _____
°F
Note: The burner must be able to maintain this minimum operating temperature without benefit of the heating
value of contaminants in the waste stream.
8. Combustion chamber temperature control _____
mechanism:
9. Minimum residence time of gases in the _____
combustion chamber at the minimum _____
Seconds _____
(°F) _____

Note: Design calculations must be submitted which incorporate fuel, air, and waste stream supply rates as well as heat transfer phenomenon (including heat recovery systems) in the determination of the minimum gas temperature and residence time in the combustion chamber.

10. Explain the design and operation of any heat recovery system associated with this afterburner system:

11. Attach a dimensioned plan(s) of the process and afterburner system. Indicate the location(s) of the burner(s), catalyst bed(s), bypass damper(s), bypass stack, and the normal stack. Clearly indicate the gas circulation pattern through preheat and burner chambers, and through heat recovery unit(s) prior to ambient discharge. Sampling ports for emission testing must also be indicated.

12. How many plans are attached? _____
13. Describe features of the system design and operation which will allow for emission testing using Department-sanctioned test methods:



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-5 (for use with BWP AQ 02, 03)
Supplemental Forms for Afterburners

Transmittal Number _____

Facility _____

F. Afterburner Operating Controls

1. List and explain all of the operating and safety controls associated with this system (include thermocouples and associated indicators/controlling pyrometers, interlock systems which prevent introduction of the waste stream until the afterburner achieves the minimum operating temperature, pilot flame detection devices, timing devices controlling purge of afterburner prior to burner ignition, high temperature limit controls, pressure switches to detect low fuel pressure or low air pressures, LEL monitors, bypass activation mechanisms, alarms, etc.). (Use a separate sheet of paper if necessary.)

2. Explain the typical process fluctuations such as changes in process rate, effluent temperatures, flow rates, fume concentrations, etc., which may affect operation of the unit. Also explain the means by which control efficiency will be maintained throughout these fluctuations:

3. What are the emergency procedures during system upsets?

G. Emissions Data

The Applicant Must Provide Detailed Information on the Presence of the Following Substances in the Contaminated Gas Stream: chlorines, other halogens, sulfur, heavymetals, asbestos.

1. Indicate the maximum gaseous emission rate:

Chemical Name	Before Control (lbs./hr)	After Control (lbs./hr)	After Control (ppm by volume)
a. _____	_____	_____	_____
b. _____	_____	_____	_____
c. _____	_____	_____	_____



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-5 (for use with BWP AQ 02, 03)
Supplemental Forms for Afterburners

Transmittal Number _____

Facility _____

G. Emissions Data (cont.)

2. Indicate the maximum particulate emissions rate:

Chemical Name	Before Control (lbs./hr)	After Control (lbs./hr)	After Control (ug/DSCM)
a. _____	_____	_____	_____
b. _____	_____	_____	_____
c. _____	_____	_____	_____
d. _____	_____	_____	_____

3. Indicate how the above emission rates were obtained, and attach appropriate calculations and documentation:

4. What is the capture efficiency of the ventilation systems serving the afterburner?

_____% And how was this calculated or determined? _____

5. What is the destruction efficiency of organic compounds (as carbon) in the afterburner?

_____% And how was this calculated or determined? _____

H. Catalytic Units Only

1. Estimated useful life of the catalyst: _____
2. How will catalyst performance be monitored? _____
3. Will the used catalyst be treated for re-use? ☐ Yes ☐ No
4. If not, how will it be disposed of? _____
5. Is the used catalyst subject to 310 CMR 30.000 pertaining to Hazardous Waste? ☐ Yes ☐ No
6. If yes, identify the disposal agency: _____

License number _____



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-5 (for use with BWP AQ 02, 03)
Supplemental Forms for Afterburners

Transmittal Number

Facility

I. Failure Notification

1. How is the failure of the collection device made known to the operator (e.g. audible alarm, lights, etc.)?

2. Describe the record keeping procedures to be used in identifying the cause, duration, and resolution of each failure (use a separate page if necessary):

J. Certification

The seal and signature of a Massachusetts Registered Professional Engineer must be entered below. This certifies that the information contained in this form has been checked for accuracy, and that the design represents good air pollution control engineering practice. (These must be originals; no photocopies, etc. of the seal and signature will be accepted.)

Print name

Authorized signature

Position/title

Representing

Date

PE number



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention - Air Control

BWP SFC-6 (for use with BWP AQ 02,03)

Supplemental Form for Electrostatic Precipitator

Transmittal Number _____

Facility _____

A. Plans Application Requirements

This form is to be submitted together with form BWP AQ CPA -1, CPA -3, or CPA -4, whenever the modification or the installation of an **Electrostatic Precipitator** is desired.

B. Project Location

Name of facility

Location of project site

Street Address

City/town

State

Zip code

C. Equipment Specifications

1. Manufacturer

2. Model number

3. What is the capacity (SCFM) of the unit? _____

4. Describing the stages: _____

a. Single stage

b. Two-stage

5. Does the units use: _____

☐ Plates

☐ Tubes

6. How many power units are there? _____

D. Conditions in the Gas Stream

1. What the inlet gas flow (acfm, wet)? _____

2. What the moisture content in the inlet? _____

lbs./min.

3. What is the inlet velocity? _____

ft./sec.

4. Describe the gas temperature: _____

inlet gas temperature (°F)

outlet gas temperature (°F)

5. Is the inlet steam pre-cooled? _____

☐ Yes

☐ No



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention - Air Control

BWP SFC-6 (for use with BWP AQ 02,03)

Supplemental Form for Electrostatic Precipitator

Transmittal Number _____

Facility _____

E. Description of Particulate Pollutant

1. Give a brief description of the particulate/aerosol in gas stream (chemical analysis):

NOTE: The answers to the following questions require supporting calculations and explanatory notes before they can be accepted as part of the plan review.

2. Describe the particle size to be emitted by the proposed unit (microns):

	% of total weight	% of fraction collected
a. < 1 micron:	_____	_____
b. = 1 < 10 microns:	_____	_____
c. = 10 < 50 microns:	_____	_____
d. > 50 microns:	_____	_____

3. Overall particulate collection efficiency: _____

4. Inlet particulate concentration: _____
gns./acf

5. Outlet particulate concentration: _____
gns./ac f

6. Emission rate: _____
lbs./hr.

7. Particulate resistivity _____
ohm-cm

8. Temperature at resistivit _____
°F

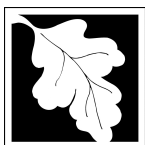
9. Measure of % water at resistivity _____

10. Is the inlet stream conditioned? ☐ Yes ☐ No

If yes, explain

11. Is the inlet stream pre-cleaned? ☐ Yes ☐ No

If yes, explain



Massachusetts Department of Environmental Protection

Bureau of Waste Prevention - Air Control

BWP SFC-6 (for use with BWP AQ 02,03)

Supplemental Form for Electrostatic Precipitator

Transmittal Number _____

Facility _____

F. Warning System

1. Describe the warning/alarm system that protects against operation when unit is not meeting design efficiency:

G. Power Requirements

1. Describe the power requirements, if the unit is single stage:

a. How is the power applied (watts/1000acfm)?

b. What is the voltage applied (kilovolts)?

2. Describe the power requirements, if the unit is two stage:

a. How much power is applied (watts/1000acfm)?

b. What is the ionizer voltage applied (kilovolts)?

c. What is the number of ionizer banks?

d. What is the collector voltage (kilovolts)?

3. Describe the transformer rectifier sets:

a. How many transformer rectifier sets are there?

b. What is the size of the transformer rectifier sets?

4. Describe the discharge electrode:

a. What length of wire is used?

b. What type of wire is used? ☐ Weighted

☐ Rigid

☐ Electrode

c. Is the wire shrouded? ☐ Yes

☐ No

H. Plate or Tube Data

1. Describe the plate dimensions (if applicable):

a. What is the height of the plate?

b. What is the length of the plate?

c. What is the thickness of the plate?

d. How many plates are there?

e. What is the spacing between the plates?



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Transmittal Number _____

Facility _____

H. Plate or Tube Data (cont.)

2. Describe the tube dimensions:

a. What is the height of the tube? _____

b. What is the inside diameter of the tube? _____

c. What is the outside diameter of the tube? _____

d. How many tubes are there? _____

e. What is the spacing between the tubes? _____

I. Particulate Removal Form Collection Electrodes

1. Thickness of the particulates at cleaning: _____

2. Method is used in cleaning the electrodes: _____

3. How often are the electrodes cleaned? _____

4. How many collection hoppers are there? _____

5. What is the capacity of each hopper? _____

6. How often are the hoppers cleaned? _____

7. What type of rapper is used? _____

8. What type of rapper control is used? _____

magnetic, pneumatic, etc.

9. What is the total time per cleaning sequence? _____

10. What is the ultimate disposal method? _____

J. Miscellaneous Data

1. Pressure drop across the unit: _____

in. water

2. Residence time of gases in the collection zone: _____

seconds

3. How many fields are there? _____

4. What is the size of the fields? _____

5. What is the field efficiency? _____

% each field

6. What is the aspect ratio? _____

7. What is the superficial velocity? _____



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J. Miscellaneous Data (cont.)

8. What type of insulators are used? _____

9. Describe the specific collecting area (SCA) (sq. ft/1000 ACFM):

10. Describe the specific corona power (SCP) (watts/1000 ACFM):

K. Certification

The seal and signature of a Massachusetts Registered Professional Engineer must be entered below. This certifies that the information contained in this form has been checked for accuracy, and that the design represents good air pollution control engineering practice. (These must be originals; no photocopies, etc. of the seal and signature will be accepted.)

Print name

Authorized signature

Position/title

Representing

Date

PE number



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-7 (for use with BWP AQ CPA-1
through BWP AQ CPA-5)

Transmittal Number _____

Facility _____

Important:

When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Determination of Best Available Control Technology

A. Applicability

Complete this form only if specifically requested to do so by the Department. Do not complete this without first consulting with the regional office. This form is not a requirement of all applicants. This form is intended as a supplement to forms BWP AQ CPA-1 through BWP AQ CPA-5 where the applicant is required to demonstrate that the source will utilize Best Available Control Technology (BACT) for the emission of a pollutant. This analysis utilizes the “top-down” approach to determination of BACT.

For additional guidance on the determination of BACT, refer to the June 1991 NESCAUM BACT GUIDELINE, attached to this form.

B. General

Facility name _____

Location _____

C. Pollutants

For the process under review, list each pollutant or class of pollutant that will be emitted and the **baseline (uncontrolled)** emission rate. These values should agree with values provided on CPA or other forms filed with this application.

*Pounds per hour is the maximum emission rate possible for the process.

**Tons per year is calculated from pounds per hour operating 8760 hours per year unless otherwise restricted (i.e. by a federally enforceable limit or permit on operation or production).

Pollutant

Uncontrolled Emission Rate

Pounds per Hour

Tons per Year**

Sulfur Dioxide (SO₂):

Nitrogen Oxides (NO_x):

Carbon Monoxide (CO):

Lead (Pb):

Particulates (PM):

Volatile Organic Compounds (VOC):

Other Pollutants (list):

1. _____

2. _____

3. _____



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-7 (for use with BWP AQ CPA-1
through BWP AQ CPA-5)

Transmittal Number _____

Facility _____

Determination of Best Available Control Technology

D. Control Options

List, in order of resulting emission rates (1 = lowest, 6 = highest), all air pollution control measures and/or devices which would result in a lower emission rate than that of the project, as proposed. Do not, at this time, eliminate from consideration any options because of economics, technical or other considerations. See the last page of this form (section J) for some examples of control options; it is not, however, a comprehensive list.

You must include:

- technology required by any regulations;
- technology that is in use on similar types of sources (existing control technology);
- technology that is in use on other types of sources but not yet demonstrated specifically on your source (technology transfer);
- theoretically applicable technology but as yet unproven on full scale installations;
- add-on control equipment;
- process modifications that will reduce emissions;
- alternative raw materials; and
- alternative fuels.

Control Description

Emission Rate After Controls (pounds per hour)

	Pollutant 1*	Pollutant 2*	Pollutant 3*
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

*Indicate pollutant



Massachusetts Department of Environmental Protection
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BWP AQ SFC-7 (for use with BWP AQ CPA-1
through BWP AQ CPA-5)

Transmittal Number _____

Facility _____

Determination of Best Available Control Technology

E. Option Feasibility

For each control option listed above, indicate the reason for not utilizing the option in this project and whether or not the technology has been demonstrated in use by a similar source.

Control Option	Basis of Elimination			Demonstrated in Use	
	Economic	Technical	Other	Yes	No
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Indicate Pollutant

F. Documentation

For each basis of elimination checked in section E on the previous page, provide a detailed explanation or calculation to substantiate the elimination of the control option. The substantiation shall include those items as delineated below:

Technical: Elimination based on technical grounds must specifically state the reason the technology is not feasible and why the system cannot be modified to accommodate the source. If the technology is in use on other sources, the difference prohibiting its use on this source must be stated in detail. Do not use cost or other qualifications in the technical documentation. **Be as specific and technical as possible.**

Economic: Elimination based on economic (cost of the control) must complete the Cost Analysis work sheet, section I. Approximations/estimates may be used as necessary. However, in the event that the Department does not concur with provided estimates, final determination of cost will be based on procedures outlined in the OAQPS Control Cost Manual (EPA Document 450/3-90-006) or other methods approved by the Department.

Other: Elimination based on other considerations must specifically state the reason the option is not feasible and why the system cannot be modified to accommodate this option. **Be as specific and detailed as possible.**



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-7 (for use with BWP AQ CPA-1
through BWP AQ CPA-5)

Transmittal Number _____

Facility _____

Determination of Best Available Control Technology

G. Additional Impacts

Describe other factors, beneficial and adverse, associated with the project and/or control option as appropriate. Include items such as:

Environmental Impacts – Describe environmental factors other than mass emissions to the air that are relevant, such as:

- visible emissions
- odor
- toxicity of emissions
- noise
- safety

Energy Impacts – Describe factors such as:

- energy consumption of different options
- impact of alternative fuel use

Impact on other media - Describe cross media impacts, such as:

- water pollution
- water supply
- solid waste
- hazardous waste, etc.

H. BWP SFC – 7 Preparer

Name _____

Company _____

Address _____

City/town _____

State _____

Zip code _____

Telephone number _____

Date _____

I. Cost Analysis Work Sheet

Total Capital Investment (TCI)

Direct Purchase Cost

1. Primary control device auxiliary equipment _____

2. Fans _____

3. Ducts _____

4. Other _____

5. Instrumentation/controls _____

Indirect Capital Cost

6. Construction _____

7. Labor _____

8. Sales taxes* _____

9. Freight charges _____



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-7 (for use with BWP AQ CPA-1
through BWP AQ CPA-5)

Transmittal Number _____

Facility _____

Determination of Best Available Control Technology

I. Cost Analysis Work Sheet (cont.)

Engineering/Planning

10. Contracting fees _____

11. Testing _____

12. Supervision _____

13. Total capital investment (add items 1 – 12) _____

14. Annualized capital cost

$$C[i(1+i)^n]/[(1+i)^n - 1]$$

i = interest rate (assume 10%)

n = life of equipment (assume 10 years or less)*

C = Total Capital Investment (line 13)

Annual Operating and Maintenance Cost

Direct Operating Cost

15. Labor _____

16. Maintenance _____

17. Replacement parts _____

Indirect Cost

18. Property taxes* _____

19. Insurance _____

20. Fees _____

21. Total annual operating costs (add items 15 – 20) _____

Energy Cost

22. Annual electrical energy expense _____

23. Annual auxiliary fuel _____

24. Total annual energy cost (item 22 + 23) _____

25. Annual waste treatment and disposal costs _____

26. Miscellaneous annual expenses _____

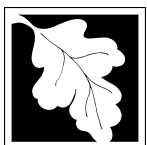
27. Annual recourse recovery & resale _____

28. Total annualized control costs
(items 14+21+25+26)-27

29. Amount of pollutant controlled over Baseline Emissions
(Tons per year)

30. Cost of control (\$/ton) (divide 28 by 29) _____

*State and federal law may provide for certain tax exemptions and special loans for the purchase of control equipment. Contact the Massachusetts Industrial Finance Agency (MIFA) or Federal Small Business Association (SBA).



Massachusetts Department of Environmental Protection
Bureau of Waste Prevention – Air Quality Control
BWP AQ SFC-7 (for use with BWP AQ CPA-1
through BWP AQ CPA-5)

Transmittal Number

Facility

Determination of Best Available Control Technology

J. Control Options (Partial list)

ADD-ON CONTROLS

- Thermal Incinerators
- Catalytic Incinerators
- Fabric Filters/Baghouses
- Cyclones
- Electrostatic Precipitators
- Condenser/Refrigeration Systems
- Wet Scrubbers:
 - Packed Bed
 - Spray Chamber
 - Other
- Carbon Adsorbers
- Other Media Adsorbers
- Dry Scrubbers
- Flares
- Non-Regenerative Carbon
- Biofilters/Soil Filters
- Non-Selective Catalytic Reduction
- Selective Catalytic Reduction
- Afterburners
- Other Add-on Control Devices

PROCESS MODIFICATION

- Reformulation of Raw Materials
- Use of Non-Hazardous/Non-Toxic Alternatives
- Combustion Controls
- Alternate Processing Techniques
- Electrostatic Spray Application
- High Volume Low Pressure (HVLP) Spray Application
- Recycling/Waste Minimization
- Alternative Fuels
- Powder Coating
- Aqueous Cleaning Compounds
- Other Process Changes